Service Manual

ORDER NO.
PET99021

POWERED SUBWOOFER

S-W20

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1. SAFETY INFORMATION

This service manual is intended for qualified service technicians ; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 – Proposition 65

NOTICE
(FOR CANADIAN MODEL ONLY)
Fuse symbols (fast operating fuse) and/or (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

REMARQUE
(POUR MODÈLE CANADIEN SEULEMENT)
Les symboles de fusible (fusible de type rapide) et/ou (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

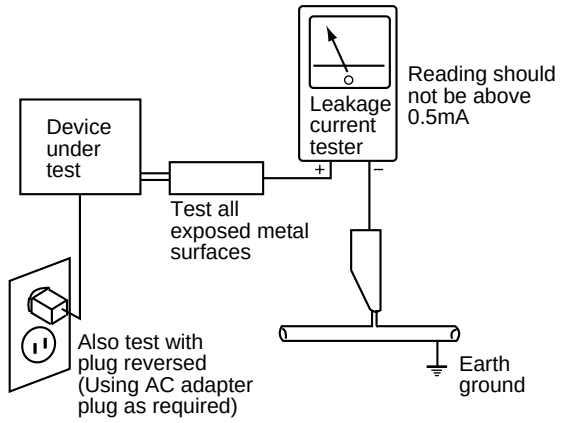
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
+
–
Device under test
Test all exposed metal surfaces
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. DISASSEMBLY

• POWER AMP SECTION

• Remove the 8 screws from the power amplifier.
• Remove the connector lead, etc.

• PLASTIC COVER

• The plastic cover is attached to the cabinet by its bosses applied with adhesive. To detach it, pry it open by inserting a flat blade scewdriver between the cabinet and the grille.

• SPEAKER

• Remove each of the 4 screws

3. PACKING, EXPLODED VIEWS AND PARTS LIST

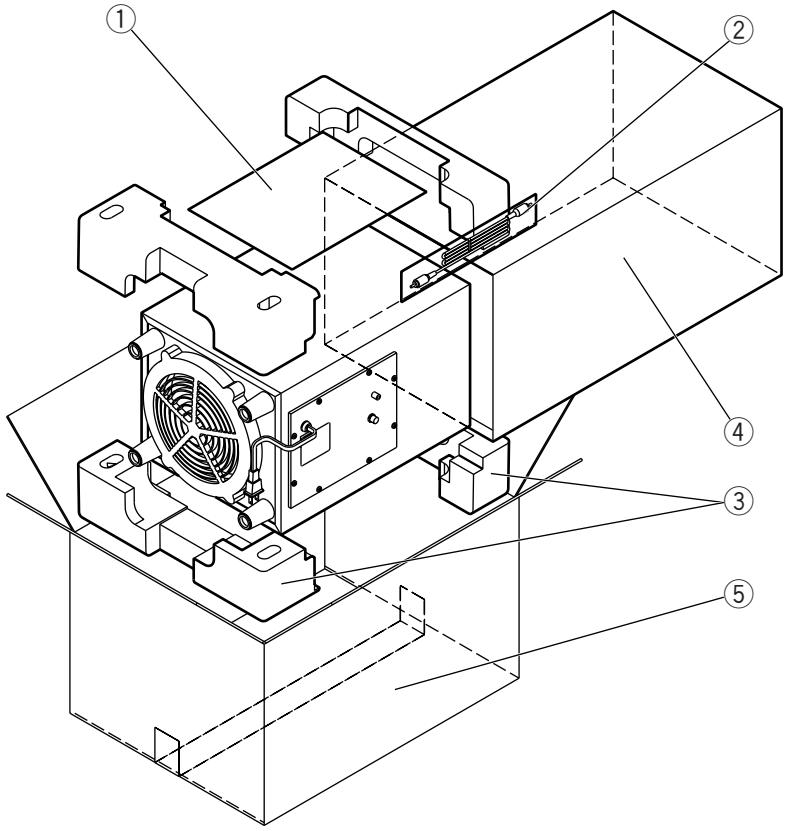
NOTES:

- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by " ◉ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

3.1 PACKING

Parts List

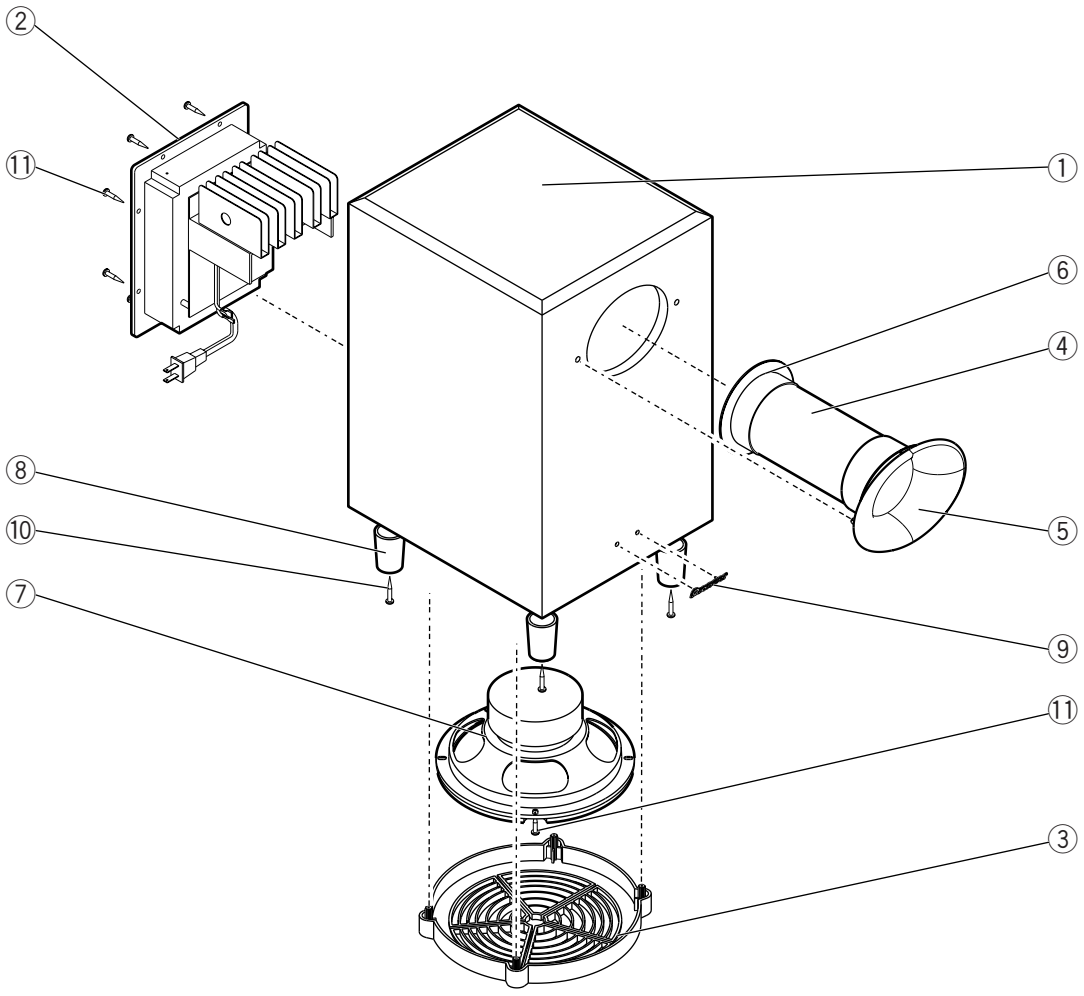
Mark	No.	Description	Parts No.
	1	Operating Instructions	272517
	2	RCA Cable Accessory Pack	255245
	3	Corner Pad Assy	275863
	4	Poly Bag	275536
	5	Packing Case	272502



3.2 EXTERIOR SECTION

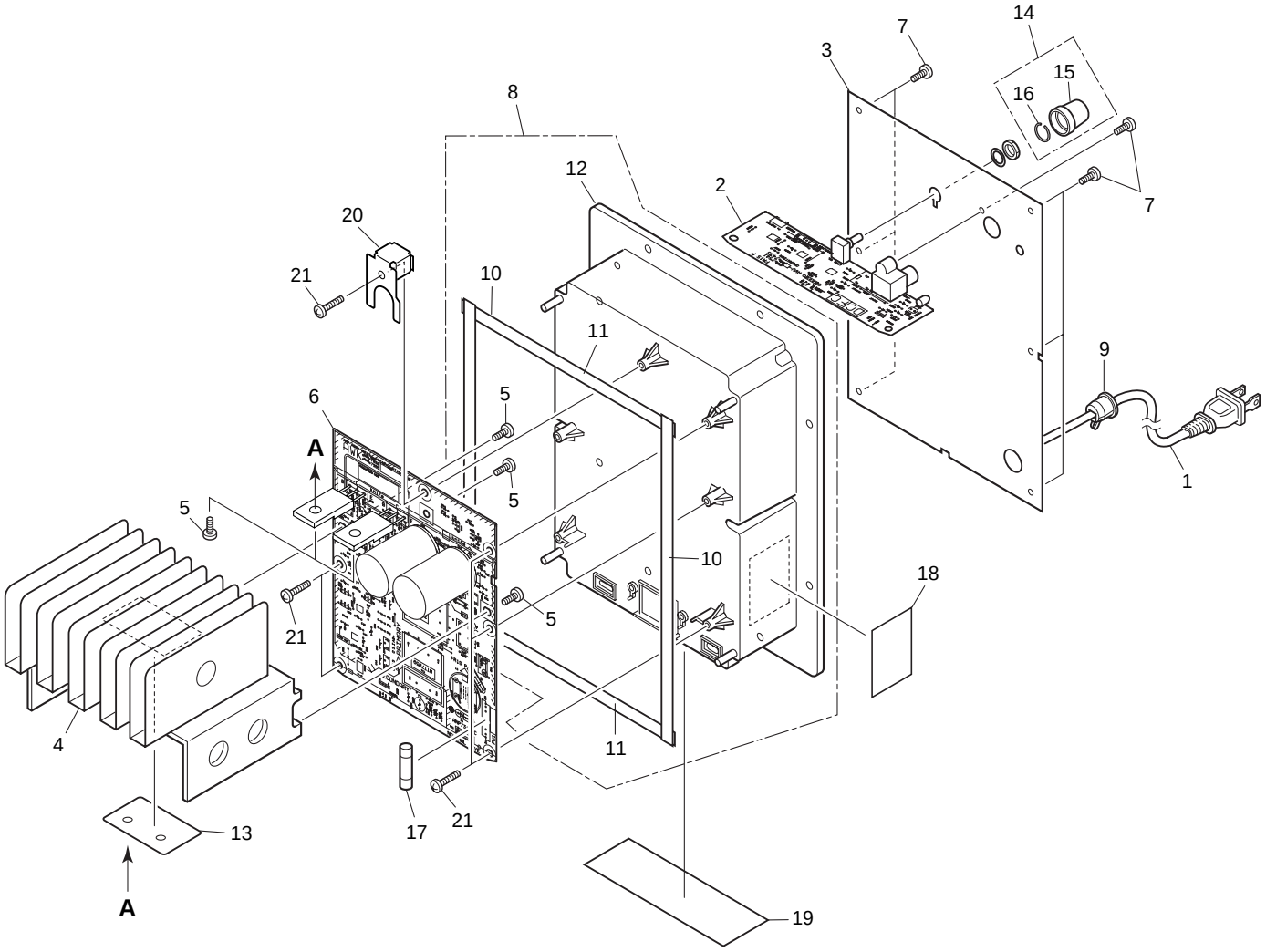
Parts List

Mark	No.	Description	Parts No.
NSP	1	Cabinet Enclosure	272562
NSP	2	Amplifier Assembly	272537
⚠	3	Plastic Cover	272428
	4	Paper Port Tube	272557
	5	Front Port Ring	275823
	6	Rear Port Ring Assembly	275858
	7	Transducer	272542
	8	Foot	255116
	9	Logo	267189
	10	Screw (for Foot)	222539
	11	Screw (for Amplifier and Trans.)	221904



3.3 POWER AMP SECTION

NOTES :
- *Parts marked by " NSP " are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Screw adjacent to ▼ mark on the product are used for disassembly.*

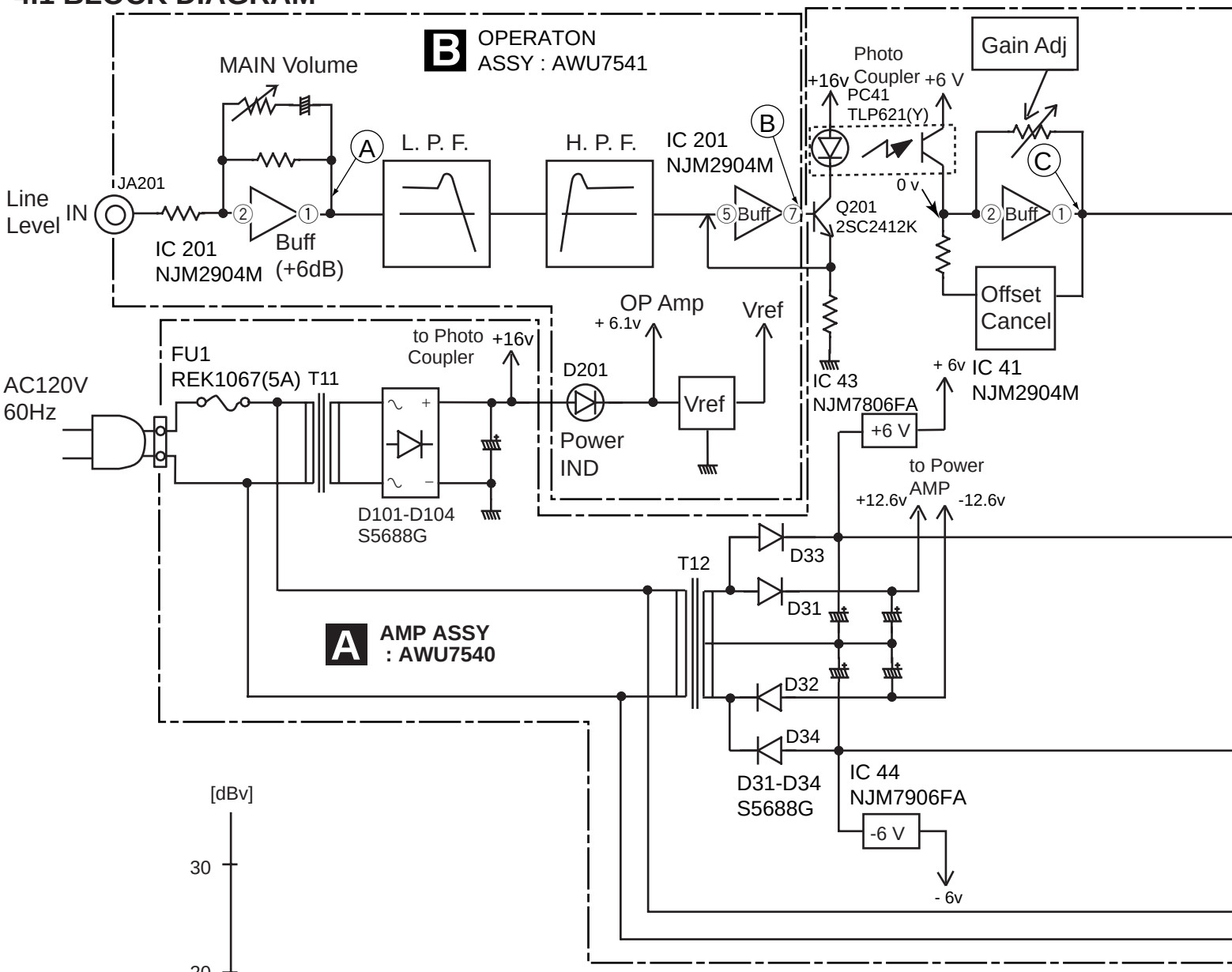


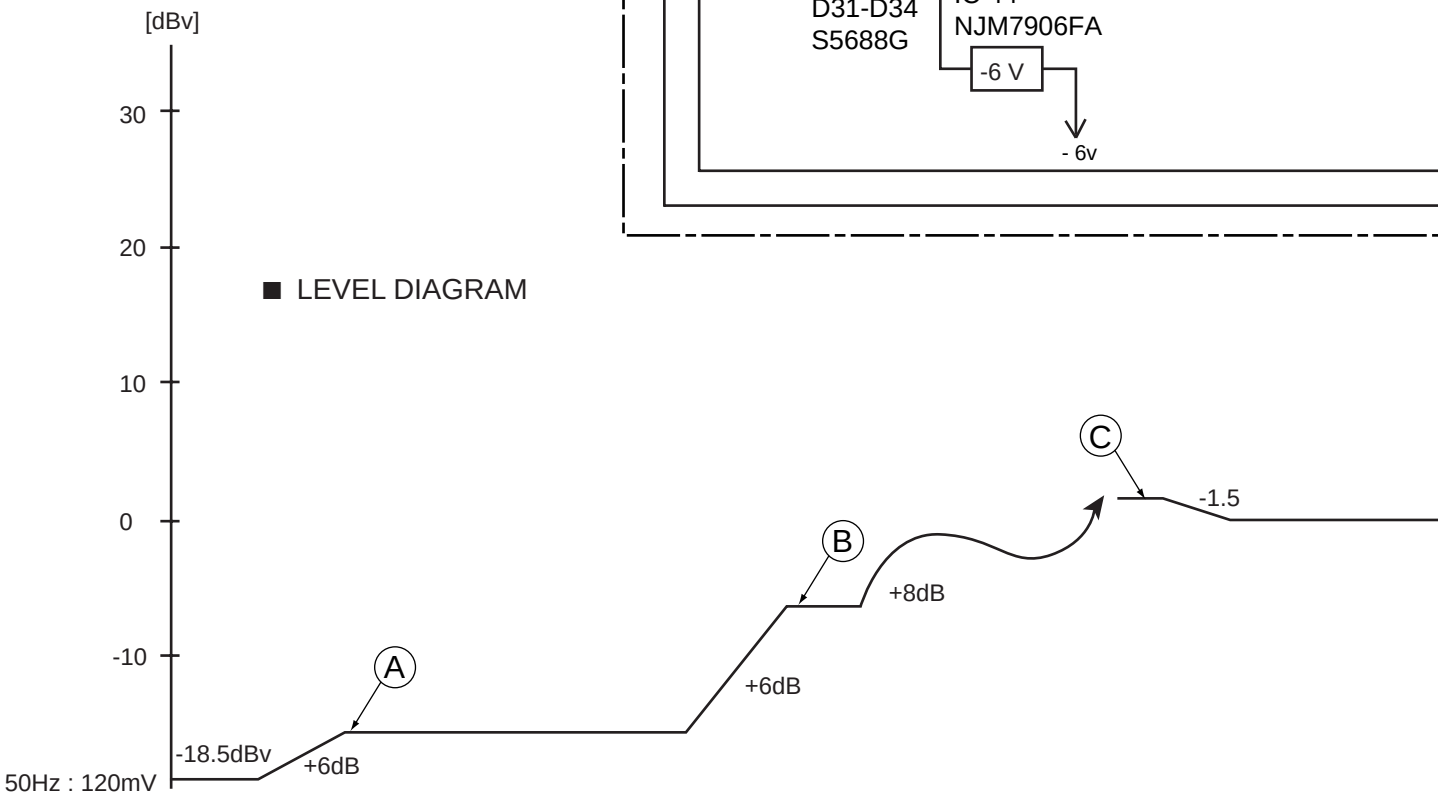
■ EXTERIOR SECTION PARTS LIST

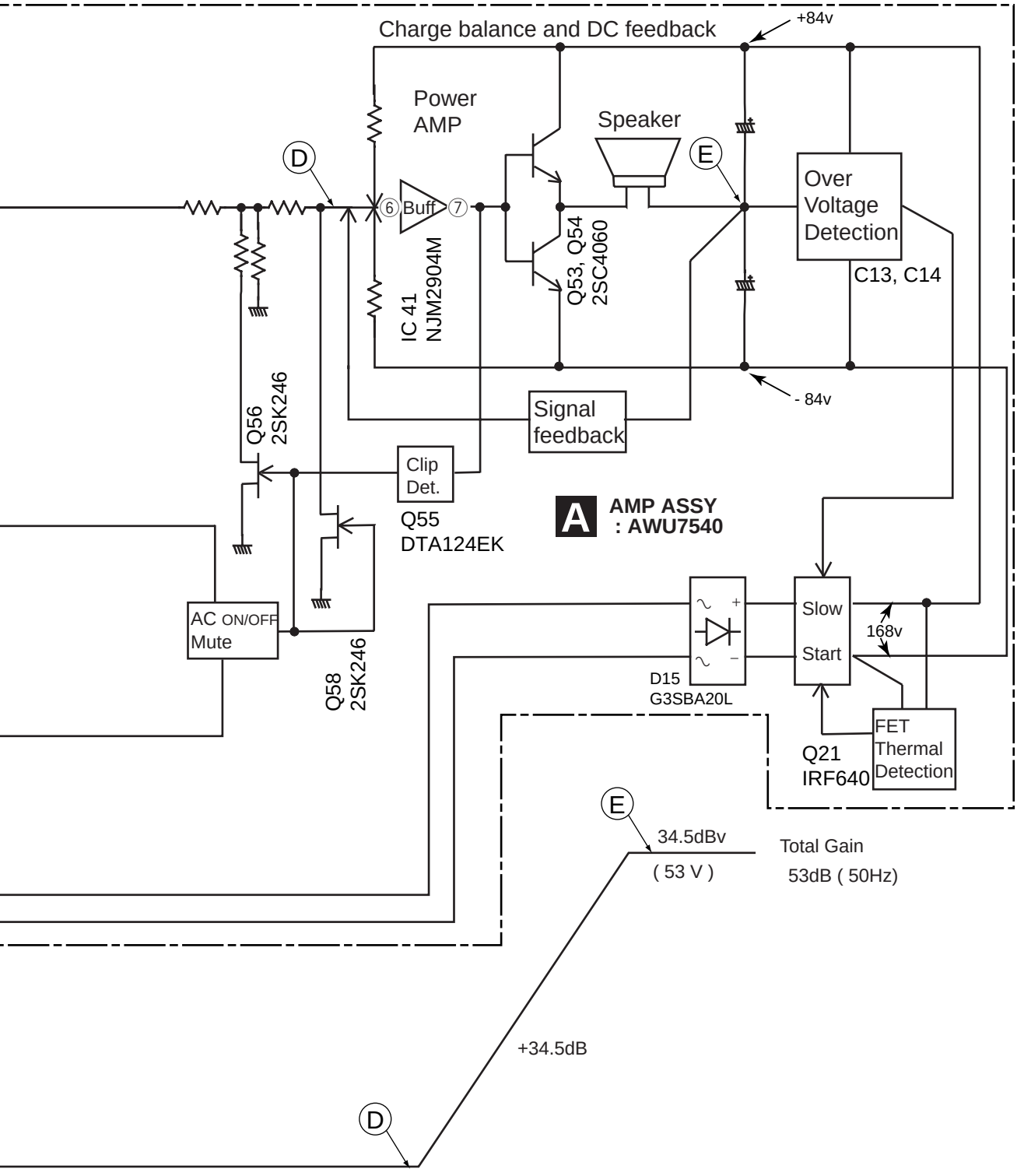
Mark	No.	Description	Parts No.
⚠	1	AC Power Cord	PDG1064
	2	OPERATION ASSY	AWU7541
	3	Operation Panel	ANC7917
NSP	4	Heat Sink	ANH7117
	5	Screw	ABA1052
	6	AMP ASSY	AWU7540
	7	Screw	BPZ30P080FZK
	8	Rear Case Assy	AXG7085
	9	Cord Stopper	CM–22C
	10	Air Packing L	AEB7172
	11	Air Packing S	AEB7174
	12	Rear Case	AMC7039
	13	Mica Sheet	AEE7033
	14	Vol Knob Assy	PXA1621
NSP	15	Vol Knob	PAC1951
NSP	16	Spring	PBH1229
⚠	17	Fuse (FU 1) 5A	REK1067
	18	Fuse Caution Label	ARW7083
	19	ICP 65 Label	ARW7084
	20	PBS Holder	ANG7329
	21	Screw	IPZ30P120FMC

4. BLOCK DIAGAM AND SCHEMATIC DIAGRAM

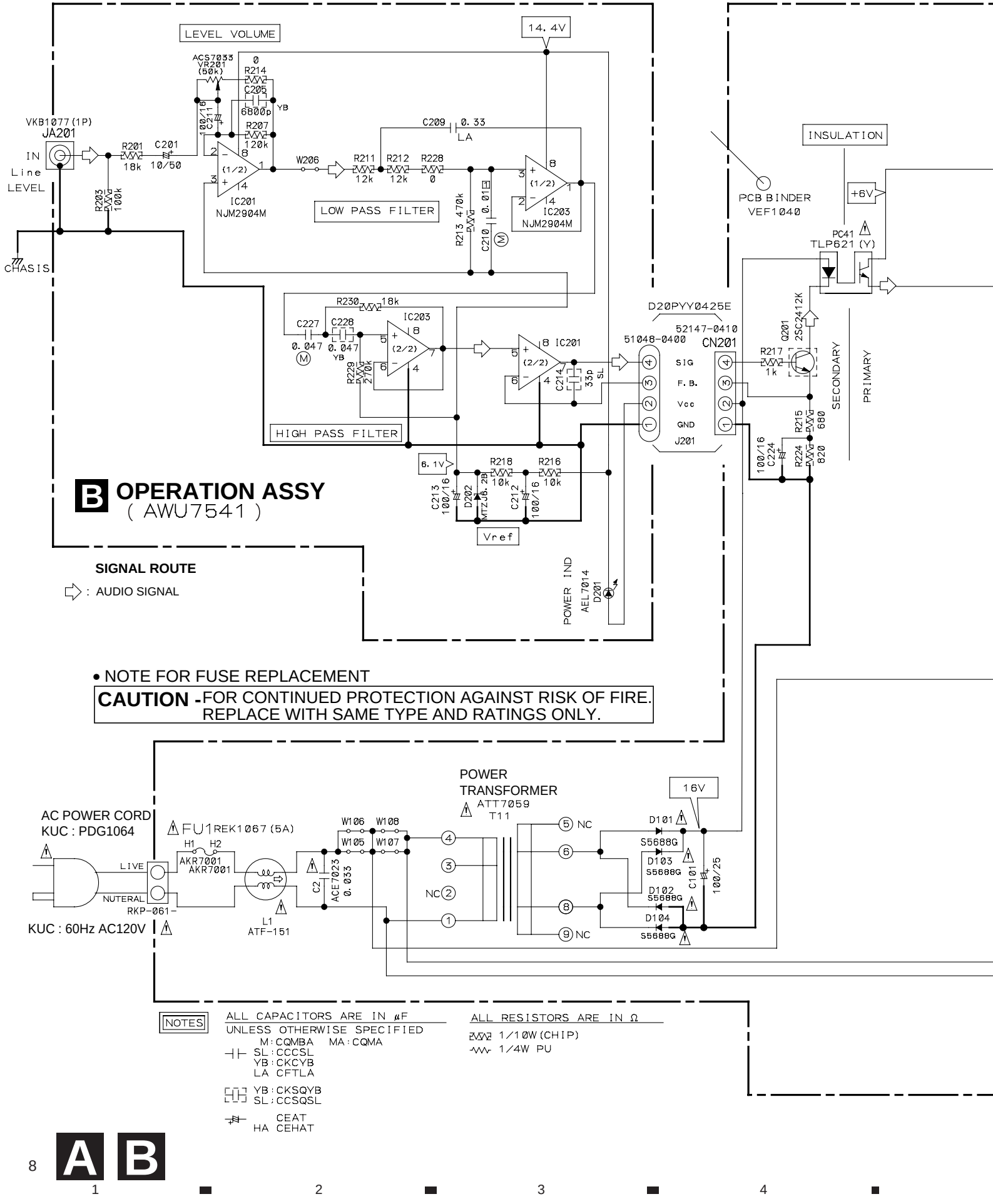
4.1 BLOCK DIAGRAM






Charge balance and DC feedback
+84v
Power
AMP
Speaker
D
E
6 Buff 7
IC 41
NJM2904M
Q53, Q54
2SC4060
Over
Voltage
Detection
C13, C14
- 84v
Signal
feedback
Q56
2SK246
Clip
Det.
Q55
DTA124EK
A
AMP ASSY
: AWU7540
AC ON/OFF
Mute
Q58
2SK246
D15
G3SBA20L
Slow
Start
168v
FET
Thermal
Detection
Q21
IRF640
E
34.5dBv
(53 V)
Total Gain
53dB (50Hz)
+34.5dB
D

4.2 AMP and OPERATION ASSYS



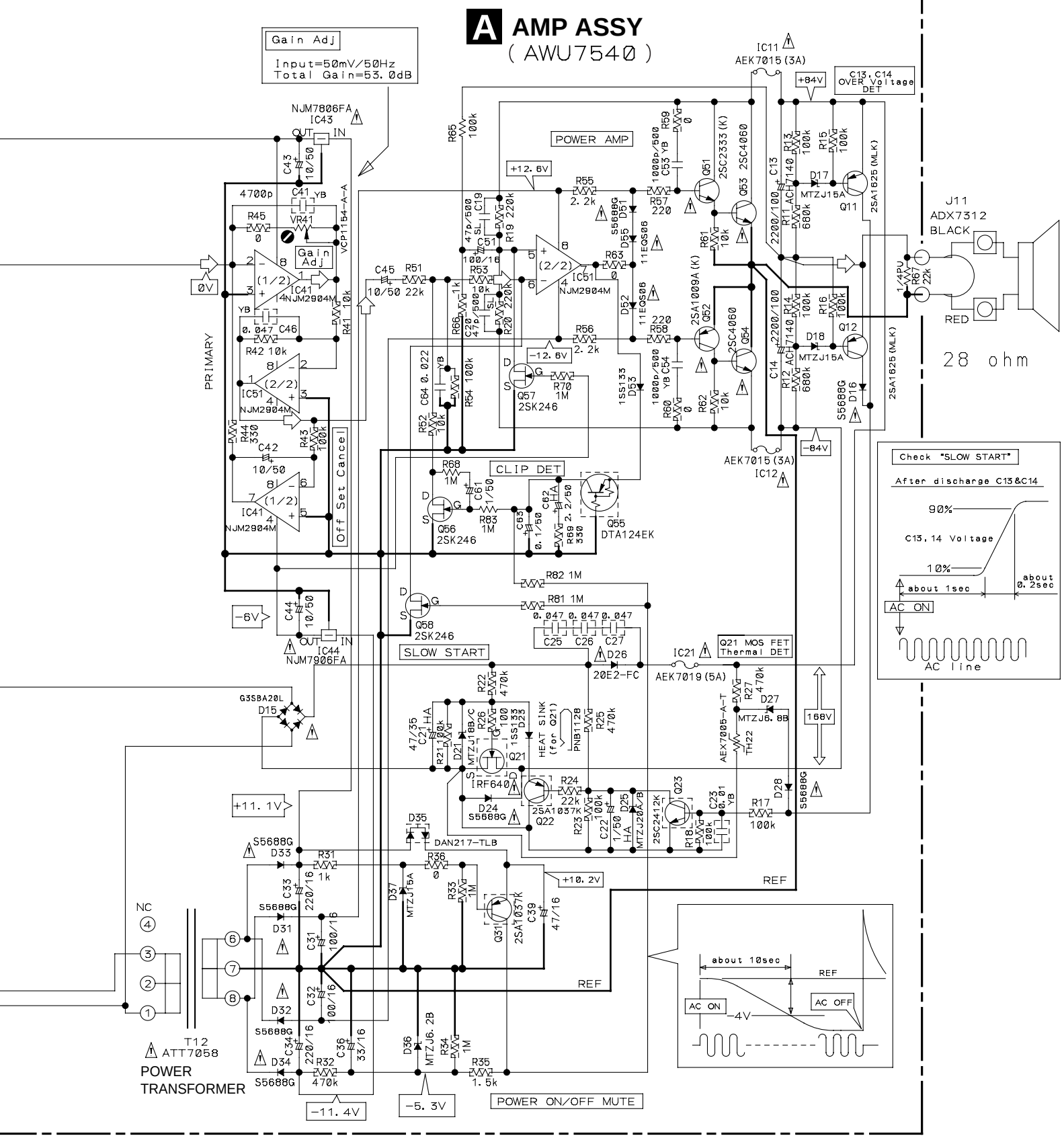
NOTES

ALL CAPACITORS ARE IN μF
UNLESS OTHERWISE SPECIFIED
M : CQMBA MA : CQMA
SL : CCCSL
YB : CKCYB
LA CFTLA
YB : CKSQYB
SL : CCSQSL
CEAT
HA CEHAT

ALL RESISTORS ARE IN Ω
1/10W (CHIP)
1/4W PU

Note : When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".

A AMP ASSY
(AWU7540)



CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TYPE NO. 491005 FOR IC21, 4910003 FOR IC11, IC12 MFD. BY LITTELFUSE INC.

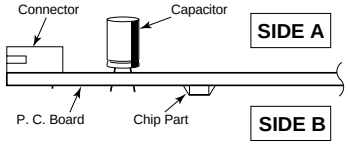
5. PCB CONNECTION DIAGRAM

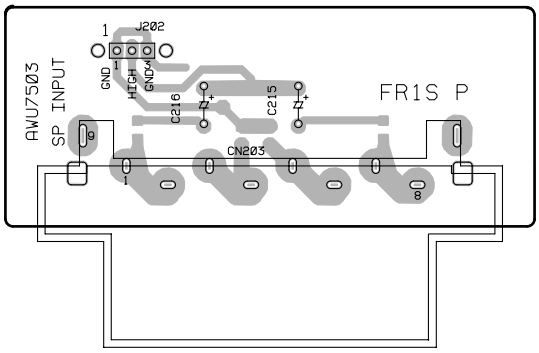
NOTE FOR PCB DIAGRAMS:

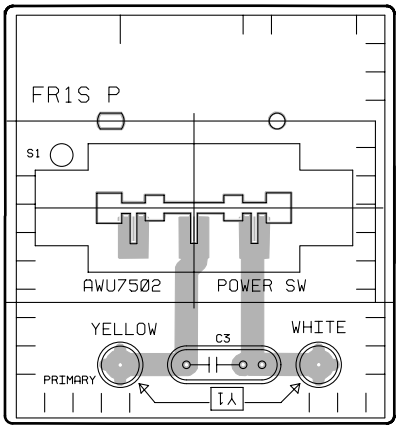
1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

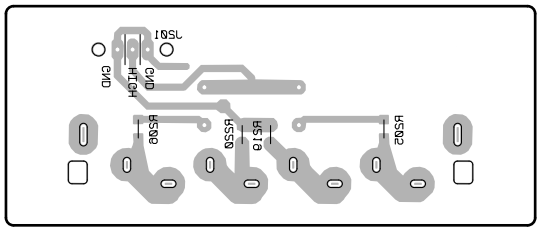
Symbol in PCB Diagrams	Symbol in Schematic Diagrams	Part Name
B C E	B C E B C E	Transistor
B C E	B C E B C E	Transistor with resistor
D G S	D G S D G S	Field effect transistor
		Resistor array
		3-terminal regulator

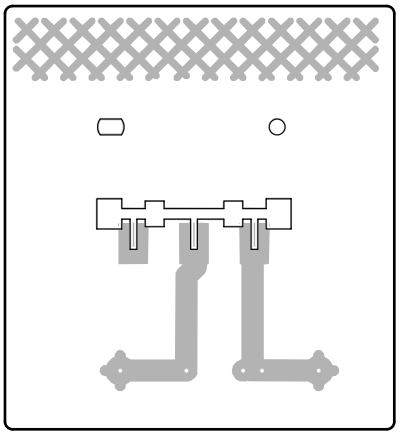
3. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
4. Viewpoint of PCB diagrams





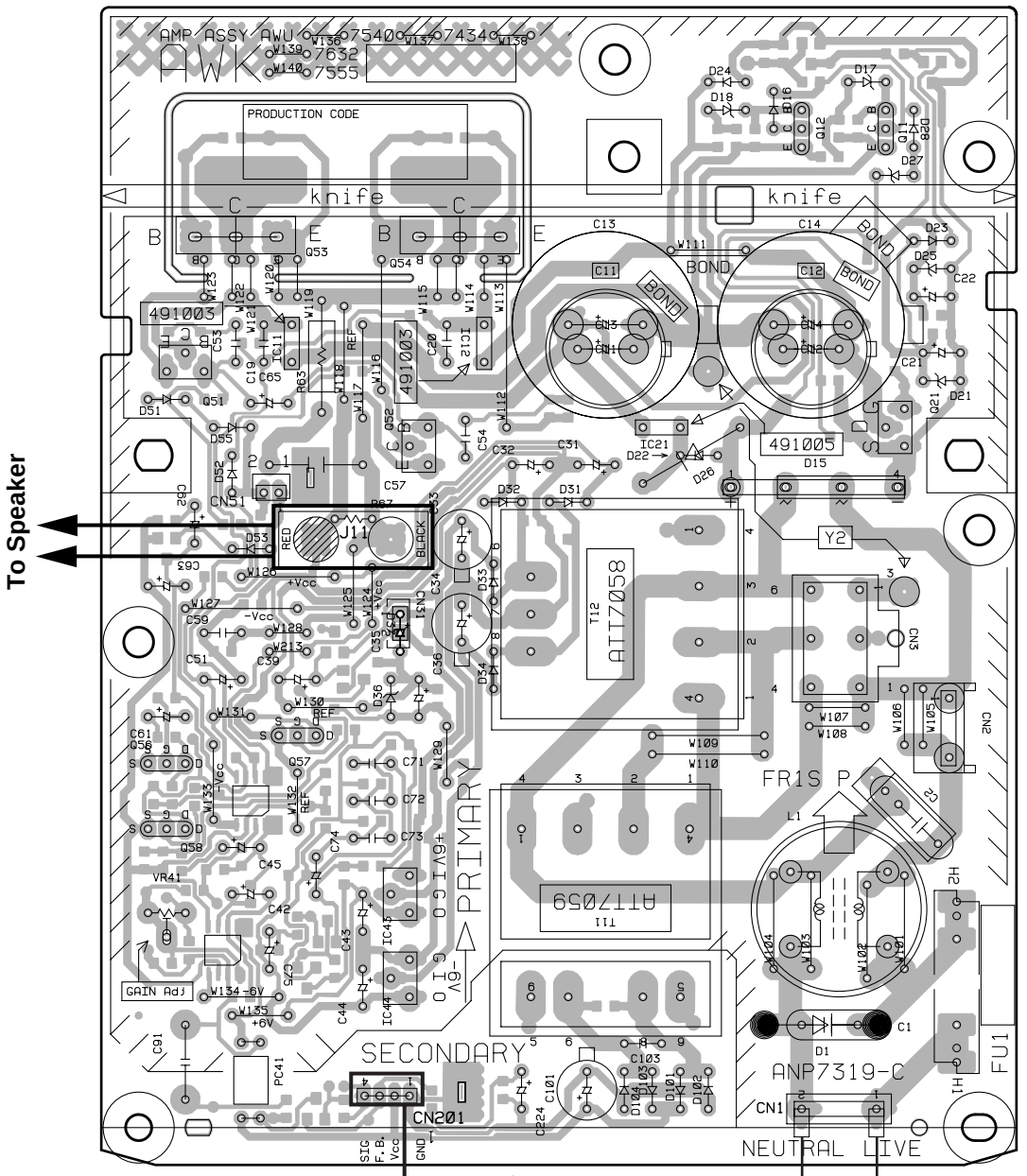




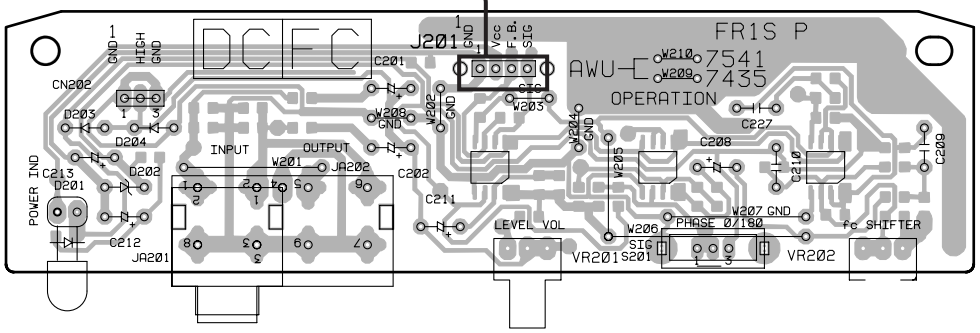


A AMP ASSY

SIDE A

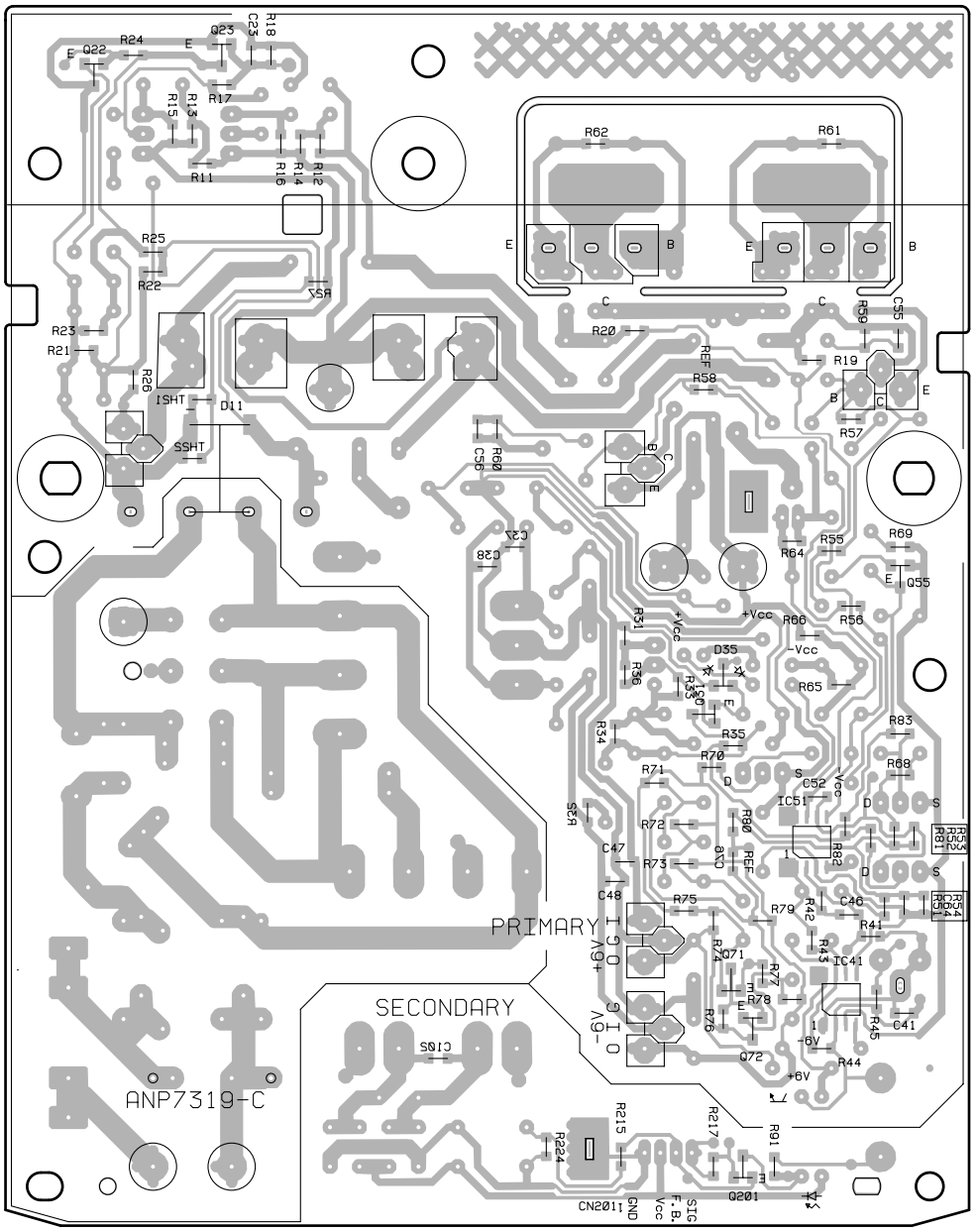


B OPERATION ASSY

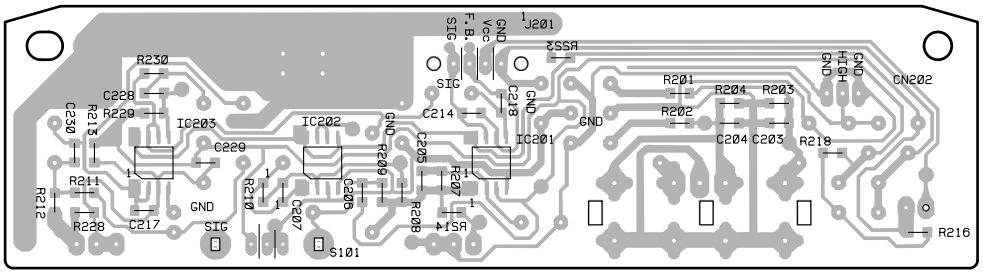


A AMP ASSY

SIDE B



B OPERATION ASSY



(ANP7319-C)

6. PCB PARTS LIST

NOTES :
- *Parts marked by "* NSP *" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω → 56 × 10 [1] → 561 ..... RD1/4PU 5 6 1 J
47k Ω → 47 × 10 [3] → 473 ..... RD1/4PU 4 7 3 J
0.5 Ω → R50 ..... RN2H R 5 0 K
1 Ω → 1R0 ..... RS1P 1 R 0 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10 [1] → 5621 ..... RN1/4PC 5 6 2 1 F

Mark	No.	Description	Part No.

LIST OF PCB ASSEMBLIES

NSP	SUB WOOFER AMP		AWK7632
	├	AMP ASSY	AWU7540
	└	OPERATION ASSY	AWU7541

A AMP ASSY

SEMICONDUCTORS

	IC41,IC51	NJM2904M
⚠	IC43	NJM7806FA
⚠	IC44	NJM7906FA
⚠	Q52	2SA1009A(K)
	Q22, Q31	2SA1037K
	Q11, Q12	2SA1625
⚠	Q51	2SC2333(K)
	Q201, Q23	2SC2412K
⚠	Q53, Q54	2SC4060
	Q56, Q58	2SK246
⚠	Q57	2SK246
	Q55	DTA124EK
⚠	Q21	IRF640
	D52, D55	11EQS06
	D23, D53	1SS133
⚠	D26	20E2-FC
	D35	DAN217
⚠	D15	G3SBA20L
	D17, D18, D37	MTZJ15A
⚠	D21	MTZJ18
	D25	MTZJ20
	D36	MTZJ6.2B
	D27	MTZJ6.8B
⚠	D101–D104,D16,D24,D28	S5688G
⚠	D31–D34	S5688G
	D51	S5688G
⚠	TH22	AEX7005
⚠	PC41	TLP621(Y)

COILS AND FILTERS

⚠	L1	ATF-151

TRANSFORMERS

⚠	T12	ATT7058
⚠	T11	ATT7059

CAPACITORS

⚠	C2 (0.033µF/250V)	ACE7023
	C13, C14 (2200µF/100V)	ACH7140
	C19, C20	CCCSL470K2H
	C42–C45	CEAT100M50
	C224, C31, C32, C51	CEAT101M16
	C101	CEAT101M25
	C61	CEAT1R0M50
	C33, C34	CEAT221M16
	C36	CEAT330M16
	C39	CEAT470M16
	C63	CEATR10M50
	C22	CEHAT1R0M50
	C62	CEHAT2R2M50
	C21	CEHAT470M50
	C53, C54	CKCYB102K2H
	C23	CKSQYB103K50
	C64	CKSQYB223K50
	C41	CKSQYB472K50
	C25–C27, C46	CKSQYB473K50
	C24	CQMA153K2E

RESISTORS

	R67	RD1/4PU223J
⚠	R26	RS1/10S101J
⚠	R57, R58	RS1/10S221J
	VR41 (4.7kΩ)	VCP1154
	Other Resistors	RS1/10S□□□J

Mark	No.	Description	Part No.
OTHERS			
	CN201	4P CONNECTOR	52147-0410
	J11	CABLE ASSY 2P	ADX7312
⚠	IC11, IC12	PROTECTOR(3A)	AEK7015
⚠	IC21	PROTECTOR(5A)	AEK7019
	H1, H2	FUSE CLIP	AKR7001
⚠		TERMINAL	RKC-061
		PCB BINDER	VEF1040

B OPERATION ASSY

SEMICONDUCTORS

IC201, IC203	NJM2904M
D201	AEL7014
D202	MTZJ6.2B

CAPACITORS

C214	CCSQSL330J50
C201	CEAT100M50
C211–C213	CEAT101M16
C209	CFTLA334J50
C228	CKSQYB473K50
C205	CKSQYB682K50
C210	CQMBA103J50
C227	CQMBA473J50

RESISTORS

VR201 (50kΩ)	ACS7033
Other Resistors	RS1/10S□□□J

OTHERS

J201	JUMPER WIRE	D20PYY0425E
JA201	1P JACK	VKB1077
	4P CABLE HOLDER	51048-0400

7. ADJUSTMENT

ATTENTION

- Don' t make speaker terminal short circuit during the power supply injection.
- Since the PRIMARY part of the AMP ASSY is not insulated, be careful of electric shock.
- Be sure to disconnect the power supply cord before touching the AMP ASSY board.
- Discharge the C13, C14 capacitors !

6.1 MEASURING INSTRUMENTS

• Provide yourself with the following measuring devides:

(1) Digital voltmeter
(2) Oscilloscope
(3) Attenuator
(4) Low-frequency oscillator

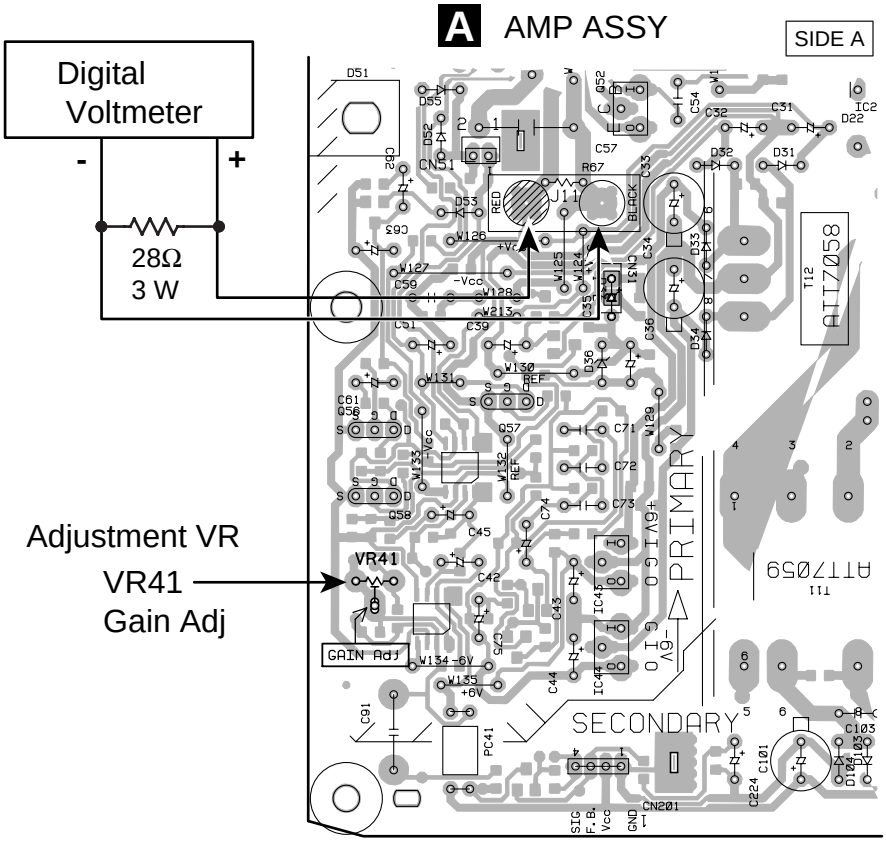
■ GAIN Adjustment

(1) Decrease the level of the Adjustment Variable resistors (VR) for the channel to adjusted.
(2) Increase LEVEL VOLUME maximum.
(3) Adjust GAIN (VR41) volume.
Apply the signal to the Line IN of JA201.

• As the gain from IN to SPEAKER OUT 53dB(freq. = 50 Hz), input of 10mVrms to Input results in output of 0.72 W (4.5 Vrms/28 Ω) at SPEAKER OUT.

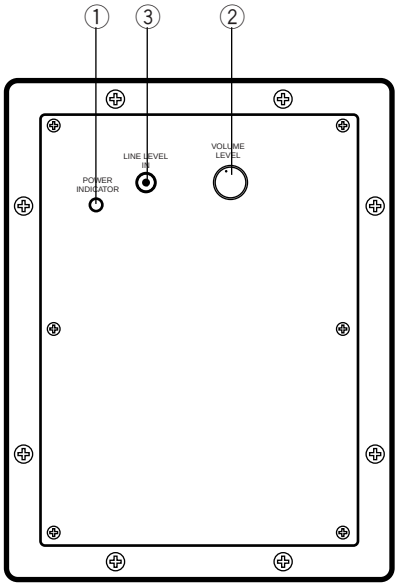
• After power-supply ON, after waiting abut 10 seconds, it adjustment because, wave form rises behind time for slow start operation.

■ Test Point



8. PANEL FACILITIES

REAR SECTION



If the output of the receiver connected to this unit is high or if the output has a low range boosted by the Bass control, Bass boost, or other means, there may be some sound distortion even if the level of the unit is lowered. In this case, lower the output level (Volume, Bass control, Bass boost) on the receiver side.

① POWER indicator

Illuminates **RED** when the power is being supplied.

② Subwoofer LEVEL knob

Volume of subwoofer is adjusted with this knob. Turn this knob clockwise to raise the level.

÷ Starting with “MIN“, turn this knob and raise the volume slowly. If the unit is turned on with the volume set too high, it could cause hearing and/or speaker damage. Do not turn the volume up excessively high. The low frequency sound is apt to be raised too high since it is less disturbing and harder to detect than high frequencies. Caution must be taken here since the amplifier and speaker of the HTP702-SW, HTP202/302-SW will be clipped when the output of the amplifier or receiver is increased with the subwoofer level set to “MAX“.

③ Subwoofer input terminal (LINE LEVEL INPUT)

Connect SUBWOOFER OUTPUT terminal of the receiver to this terminal with the accessory RCA cord.

9. SPECIFICATIONS

	S-W20
Cabinet	A floor, bass-reflext type, with a built-in amplifier having a PVC-sheet finish with a wood pattern.
Speaker	20 cm (8 inch)
Power Amplifier	**Continuous Average Power Output is 100 Watts* min, at 28 ohms from 20 Hertz to 200 Hertz with no more than 1%** total harmonic distortion.**
Input (Sensitivity at 200 Hz/ impedance) *Line level input	100 mV / 18 kΩ (at 60 Hz)
Crossover Frequency	150 Hz
Outline Dimension (W x H x D)	255 x 447 x 290 mm 10 x 17-5/8 x 11-7/16 inch
Weight	7.6 kg (16 lb 12 oz)
Power Requirements	120 VAC, 60 Hz
Power Consumption	64 W 130 VA
Accesories	RCA cord (10ft.) x 1 Operating instructions x 1

Note: *Specifications and design subject to possible modification without notice due to improvements.*

* *Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*
** *Measured by Audio Spectrum Analyzer.*